COURSE OVERVIEW OE0026
Design, Inspection & Maintenance of Marine Structures

Course Title
Design, Inspection & Maintenance of Marine Structures

Course Date/Venue
Session 1: April 20-24, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: September 22-26, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
OE0026

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our-state-of-the-art simulators.

The aim of this course is to provide the participants with a complete and up-to-date overview of nearshore fixed marine structure engineering in general and steel jackets (platforms) in particular. It will give a picture of the work of ocean and structural design engineers, using case studies to highlight the topics discussed.

The course will cover the design, construction, inspection, maintenance and repair of nearshore fixed marine structures/platforms in accordance with API and ISO standards; discuss the various types of nearshore fixed marine structures including their advantages, disadvantages and design requirements; analysis of the ocean environment affecting nearshore fixed marine structures which includes wind, waves & environmental forces, currents, tides and storm surge; design criteria for steel jackets including simplified procedures suitable for the first stages of design of a small liftable jacket; the layout of jacket frame and other structural topics for jacket design; and the correct diameter, thickness and bending in member design, strength, approaches to fatigue in joint design and pile capacity of foundation piles.

During the course, participants will be able to apply proper load-out, transportation, installation and commissioning methods related to nearshore fixed marine structures; execute proper launch of a steel tower; recognize and employ the standards and specification of risk assessment for nearshore fixed marine structure; practice the software available for use in jacket analysis and design; and employ sub-sea inspection, cathodic protection, corrosion allowance, flooded member detection and other surveys in protecting and maintaining the structure.

Proper methodology for estimating response based conditions for design against extremes, typical results and consequences; describing the factors that control the ultimate strength of the steel structures; emphasizing the principles of structural reliability analysis as well as the principles of cost/benefit analysis and considerations of risk; explaining vortex-induced-vibration, wave slamming and diffraction forces related to waves and environmental forces affecting the nearshore fixed marine structures as well as the importance of deck elevation, role of model testing and wave-structure interaction; and identifying the things that go wrong especially the opportunities and present problems arising in project management and engineering will also be covered during the course.

Upon the successful completion of this course, the participant will have a satisfactory understanding of the planning, concept development, design, construction, installation, operation, inspection and maintenance of Offshore Structures.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply systematic techniques on nearshore fixed marine structure design, construction, inspection, maintenance and repair
- Discuss the various types of nearshore fixed marine structures including their advantages and disadvantages & design requirements
- Analyze the ocean environment affecting nearshore fixed marine structures which includes wind, waves & environmental forces, currents, tides and storm surges
- Employ design criteria for steel jackets including simplified procedures suitable for the first stages of design of a small, liftable jacket as well as give emphasis on the layout of jacket frame & other structural topics for jacket design
- Determine the correct diameter, thickness & bending in member design, strength & approaches to fatigue in joint design and pile capacity of foundation piles
- Apply proper load-out, transportation, installation and commissioning methods related to nearshore fixed marine structures and execute the proper launch of a steel tower
- Recognize and employ the standards and specification of risk assessment for nearshore fixed marine structure
- Practice the software available for use in jacket analysis & design and employ sub-sea inspection, cathodic protection, corrosion allowance & flooded member detection and other surveys in protecting and maintaining the structure
- Employ proper methodology for estimating response based conditions for design against extremes, typical results and consequences

- Describe factors that control the ultimate strength of the steel structures and give emphasis on the principles of structural reliability analysis as well as the principles of cost/benefit analysis and considerations of risk
- Explain vortex-induced-vibration, wave slamming and diffraction forces related to waves and environmental forces affecting the nearshore fixed marine structures as well as the importance of deck elevation, role of model testing and wave-structure interaction
- Identify the things that go wrong especially the opportunities and present problems arising in project management and engineering

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides a complete and up-to-date overview of nearshore fixed marine structure design, construction, inspection, maintenance and repair for civil/structural design engineers, engineers who are newly qualified, who have recently moved into nearshore fixed marine structural engineering or hold broad responsibilities that include nearshore fixed marine structures in oil and gas, construction, design and installation companies and regulatory authorities. Further, this course is also beneficial for AGP managers, engineers, specialist, and other professionals who are responsible for their function or subject area.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 8,000 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Certificate(s)
Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations
Certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **3.0 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Captain Sergey Kole, is an **International Expert** in **Port Operations & Logistics Management** with over **25 years** of **onshore** and **offshore** experience within the **Oil & Gas**, **Petroleum** and **Refinery** industry. His expertise widely covers in the areas of **Anatomy of Shipping**, **Logistics & Transportation Planning** Methods, **Forecasting Logistics** Demands, Visual Network Model, **Logistics Operations**, **Tanker Vetting & Inspection**, **Marine Vetting & Audit Criteria Manual** for **Tank Ships**, **Marine & Ship Vetting**, **Vetting Process & Marine Safety Criteria**, **Tanker Vetting** for **Terminals**, **Ship Vetting**, **Marine Terminal** Operations & Management, **Marine Hazards** Prevention & Control, **Marine Communication** Systems, **Marine Safety**, **Ship** Management, **Oil Terminal** Planning, **Vessels** Operations, **Terminal** Management & Support Operations, **Oil Spill Contingency & Emergency Response Plan**, **Qualitative & Quantitative Risk** Assessments, **Terminal** Planning, **Oil Tanker Storage** Planning, **Cargo Transfer** Handling, Loading & Discharging, **Ballasting**, **Tank** Cleaning, **Crude Oil Washing**, **Ship** Handling, **Radar** Navigation, **Navigational** Aids, **Meteorological** Data Review, **Sea & Weather** Condition Monitoring, **ERT Vessel** Coordination and **Transport & Distribution Carrier**. Further, he is well-versed in **Sea-going** Personnel Human Resource Management, **Survival Craft & Rescue Boats**, Dynamic Positioning, Anti-Piracy Preparedness & Response, **Shipping** Maintenance System, **Oil & Chemical Tanker**, **Liquefied Gas Tanker**, **Inert Gas** System, **Crude Oil** Tanker & Gas Carrier, Offshore Logistics & Supply Management, **Marine Fleet** Management & Operations, **International Maritime Conventions & Codes**, **Marine Radar**, **Port Traffic Control** Systems & Instrumentation, **H^2S** Hazard Awareness, **Firefighting**, Medical Care Onboard, Carriage of Dangerous & Hazardous Substances and **Ballast Water & Sediment** Management.

During his career life, Captain Sergey has gained his technical and marine expertise through various challenging key positions such as being the **Captain**, **Operations Director**, **Project Manager**, **Port Supervisor**, **Master** of General Cargo Ship, **Master** of Container Ship, **Chief Officer**, **Marine Operations Specialist**, **Marine Coordinator**, **On-call Duty Officer**, **Crewing Consultant**, **2nd Officer**, **Ship Chandler** and **Senior Instructor/Trainer** for several international companies such as **ZADCO**, **AMEC Foster Wheeler**, Fircroft Engineering Services, Ltd., Rusalina Yacht Company, Van Oord Offshore, Exxon Neftegaz Ltd (ENL), Jr Shipping, Carisbrooke Shipping, Unicorn Petrol ve Kimya, Q Shipping BV, m/v Tradeport, Miedema Shipping CV, Rah Management BV, Petrobulk Maritime Inc., Empross Lines Ship Management, Melcard Ltd., Aquarian Shell Marine Inc., Mercy Baaba and Square Ltd.

Captain Sergey has a **Bachelor's** degree in **Navigation** in **Nautical Studies** from the **Kiev State Academy** of **Water Transport**, **Ukraine** and holds a **Master Mariner** (Unlimited) Certificates of Equivalent Competency from the MCA, UK and NSI, Netherlands. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, courses, seminars, workshops and conferences internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 - 0930	***Introduction to Nearshore Fixed Marine Structures*** *General Introduction to Marine Structures – Types & Applications ● Purpose ● Importance in Field Development ● Economic Considerations ● Aspects of Design ● API and ISO Codes ● Introduction to Design Sequence and its Interaction with the Different Topics Covered in the Course*
0930 – 1030	***Typical Nearshore Fixed Marine Platform Nomenclature; Interactions with Regulatory Bodies*** *Nearshore Fixed Marine Engineering Lingo ● Class Discussion*
1030 – 1045	*Break*
1045 – 1115	***Types of Structures*** *Description of Fixed, Floating, Mobile and Subsea ● Advantages and Disadvantages ● Design Requirements ● Specifications for Materials & Fabrication for Marine Structures*
1115 – 1145	***Ocean Environment*** *Winds, Waves, Currents, Tides and Surges ● Probability and Estimation of Extreme Environments*
1145 – 1215	***Steel Jacket*** *Design Criteria ● Factors Determining Different Parts of Structure ● LRFD Versus WSD Codes ● Codal Requirements for Design*
1215 – 1230	*Break*
1230 – 1245	***Video Presentation*** *VHE-15 "The Piper Alpha Disaster"*
1245 – 1300	***Introduction to the Design of a Small & Liftable Jacket*** *Background ● Outline of a Simplified Procedure Suitable for the First Stages of Design*
1300 – 1330	***Layout of Jacket Frame*** *Deck Elevation ● Batter ● Brace Patterns ● Transfer of Forces Through the Structure*
1330 – 1420	***In-Place Analysis of Jackets & Topsides-Models & Loads***
1420 - 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Dynamic Response Analysis of Jackets***
0830 - 0845	*Break*
0845 – 0930	***In Place Analysis of Piles, Jackets & Topsides-Strength Checks & Results Processing***
0930 – 1045	***Miscellaneous Strength Checks in Jacket Members***

1045 – 1115	***Pushover Analysis of Jackets***
1115 – 1145	***Analysis & Design of Jackets & Boat Landing Structures for Ship Impact***
1145 – 1215	***Software for Jacket Design – SACS®, ANSYS, StruCad, USFOS, etc.*** *Review of Software Available for Use in Jacket Analysis and Design ● Introduction to SACS® Software*
1200 – 1215	*Break*
1215 – 1245	***Member & Joint Design*** *Calculation of Member Strength. Determination of Diameter, Thickness, Bending ● Jointcan Strength*
1245 – 1330	***Foundation Piles*** *Pile Design ● Soil Data ● Pile Capacity - Axial and Shear*
1330 – 1420	***Response Based Design*** *Overview of Methodology for Estimating Response Based Conditions for Design Against Extremes, Typical Results and Consequences*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Class Exercise on Jacket Design by Hand*** *Design of Jacket & Topside Structural Systems ● Preliminary Basic Design of a Jacket by Hand Using API RP-2A Recommendations*
0830 - 0845	*Break*
0845 – 0930	***Exercise on Jacket Design Using Software*** *Building a Simple Model Using SACS®*
0930 – 1045	***Exercise on Jacket Design: Presentation & Discussion*** *Discussion of Project for Hand Designing a Simple Jacket*
1045 – 1115	***Load-out, Transportation, Installation & Commissioning*** *Aspects Affecting Jacket Design ● Practical Considerations and Limitations ● Choice of Approach*
1115 – 1130	***Introduction to Fatigue Assessment***
1130 – 1200	***Fatigue Analysis Methods*** *The Palmgren-Miner Hypothesis; Spectral vs. Deterministic Fatigue Approaches*
1200 – 1230	***Deterministic Fatigue Assessment***
1230 – 1245	*Break*
1245 – 1300	***Spectral Fatigue Analysis***
1300 - 1330	***Risk Management*** *ISO 18001 ● Risk Assessments ● Leadership*
1330 – 1420	***Above Water & Sub-Sea Inspection*** *Methods (Particularly MPI), Targets, Results, Repair or Not? Risk-Based Underwater Inspection and Structural Integrity Management Plan ● Corrosion Protection Systems for Marine Structures ● Cathodic Protection, Corrosion Allowance, Ship Impact, Inspection and Maintenance ● Repair*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

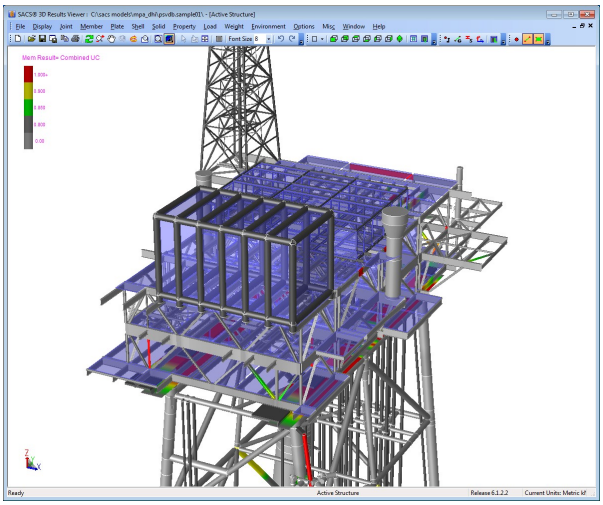
0730 – 0830	***Structural Reliability*** *The Historical Performance of Nearshore Fixed Marine Structures ● Principles of Structural Reliability Analysis ● Aspects Determining Reliability, Load Statistics and the Probability of Failure*
0830 - 0845	*Break*
0845 – 0930	***Ultimate Strength of Steel Structures*** *Factors that Control the Ultimate Strength of the Structural System ● Reserve Strength Ratio ● Estimation of Ultimate Strength by Pushover Analysis*
0930 – 1045	***Seismic Analysis of Marine Structures***
1045 – 1100	***Lift Studies of Prefabricated Modules***
1100 – 1115	***Loadout Analysis of Prefabricated Modules***
1115 – 1130	***Transportation Analysis of Prefabricated Modules***
1130 – 1200	***On-Bottom Stability Analysis of Jackets***
1200 – 1230	***Mooring System Design & Analysis***
1230 – 1245	*Break*
1245 – 1330	***Life Extension Engineering of Marine Structures***
1330 – 1420	***Miscellaneous Studies for Port Engineering***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Design Aspects of Breakwaters***
0830 – 0845	*Break*
0845 – 0930	***Video Presentation*** *VHE-39 "Risk Assessment"*
0930 – 1030	***Cost/Benefit Analysis*** *Principles of Cost/Benefit Analysis and Consideration of Risk ● Applications*
1030 – 1100	***Waves & Environmental - VIV*** *Vortex-Induced-Vibration ● Wave Slamming ● Diffraction Forces*
1100 – 1130	***Platform Disasters*** *Review of the Major Accidents Involving Nearshore Fixed Marine Structure and Loss of Life ● Lessons Learnt*
1130 – 1200	***Platform Decommissioning***
1200 – 1230	***Case Studies*** *Underwater Inspections Scopes of Work and Report*
1230 – 1245	*Break*
1245 - 1345	***Things that Go Wrong, Opportunities*** *Reviews Problems Arising in Project Management and Engineering ● Lightweight Jacket or Sub-sea?*
1345 – 1400	***Course Assessment & Conclusion*** *Distribution of Student's Course Assessment Questionnaires*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Offshore Structural Analysis Computer System (SACS®)" simulator.



Offshore Structural Analysis Computer System (SACS®)

Course Coordinator

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